

DEPARTMENT OF THE ARMY



*"A Pathway to Federal Opportunities"*

# Females and Minorities in Engineering and the Sciences

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***Department of the Army - Minority College Relations  
Program Workshop***



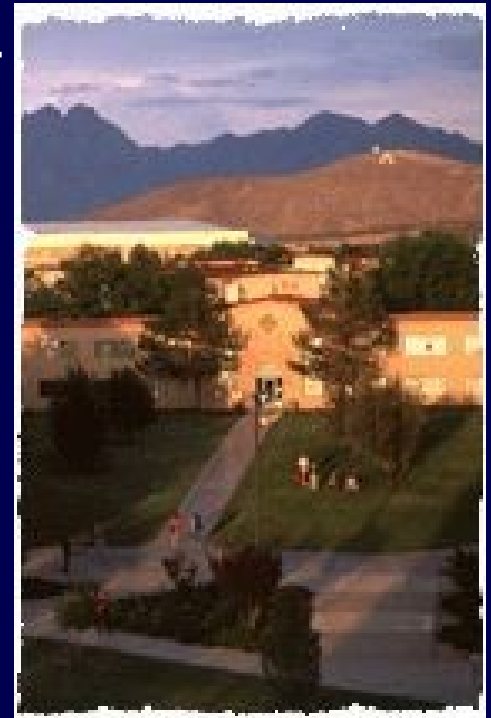


# Overview of the Presentation

- Brief background of New Mexico State University and the College of Engineering
- Presentation of the challenge
  - Statistics
  - Consequences
  - Outlook
- How are we addressing the challenge?
- Opportunities for partnerships
- Discussion and questions

# Background of New Mexico State University

- Established 1888, total headcount 15,224
- Degrees Offered, 74 Bachelors, 51 Masters, 22 Ph.Ds
- Carnegie Doctoral Research Extensive
- Hispanic Serving Institution
  - Overall undergraduate – 51% minority enrollment





# Background of the College of Engineering




- College of Engineering – undergraduates - 54% minority enrollment, graduate level - 20% minority enrollment, 19% female enrollment at both the undergraduate and graduate levels although this percentage varies greatly by department at the undergraduate level.
- College of Engineering Faculty – 81 total, 75 male and 6 female, Race/Ethnicity – 10 Hispanic
- 2000-2001 COE Granted 97 Masters Degrees and 12 Doctorates



# More on NMSU's Recognitions

- Top 15 schools nationally that are the baccalaureate origin of engineering doctorates for Hispanics
- Top 20 schools in the country with Hispanic graduate science and engineering enrollment
- I.E. Ph.Ds...on average for the past three years we have granted approximately 10% of all the I.E. Ph.Ds to women in the U.S.



# So Why Should We be Concerned?

- NMSU is a majority minority institution – excellent programs in place to assure success of our students, targeted programs for retention
- Several NSF programs for recruitment of minority faculty and women specifically in science and engineering
- National status in engineering and science accomplishments of the university and our students

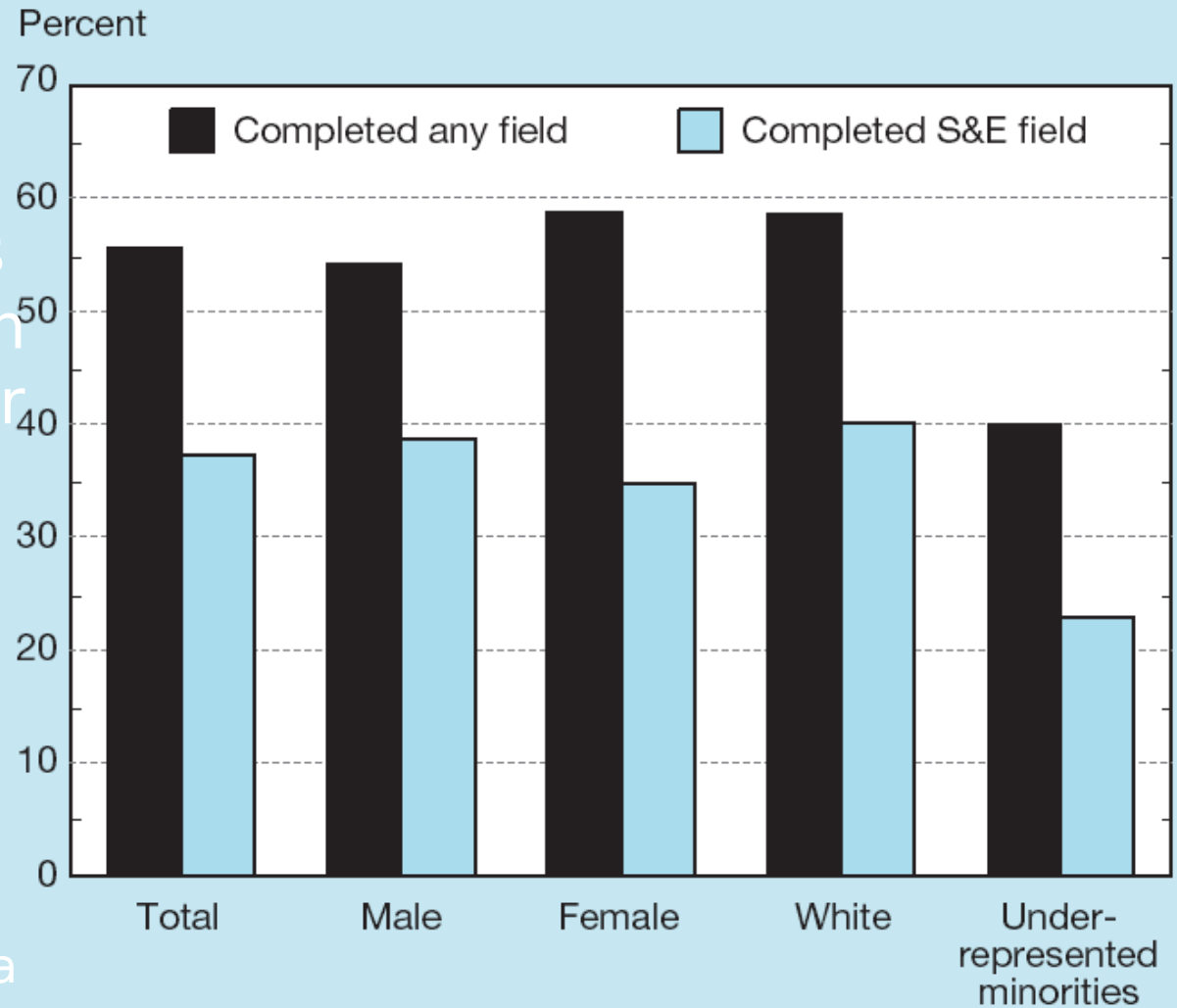


# The Challenge for Colleges and Universities

- Overall, female and minority enrollment, (male and female), in engineering and science undergraduate and graduate programs is greatly disproportionate with general population statistics.
- Female and minority retention in S&E is lower than other groups.
- Shrinking number of U.S. citizens pursuing graduate and doctoral degrees in engineering and growth rate of females and minorities awarded graduate degrees is minimal.

# Graduation and Completion Rates Of 1992 Freshman Intending to Major In S&E Fields

Source:  
Science & Engineering  
Indicators - 2002  
University of Oklahoma

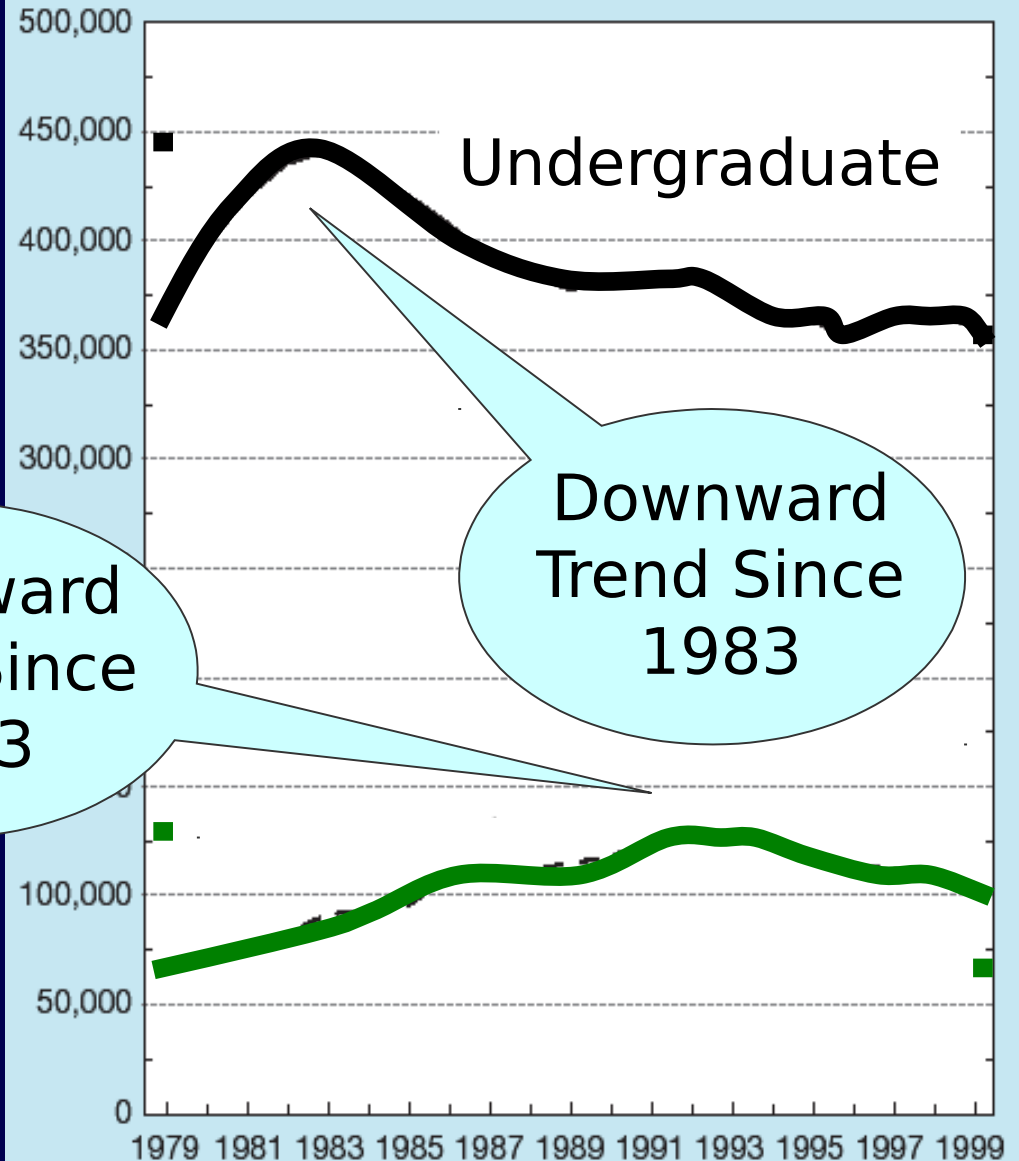




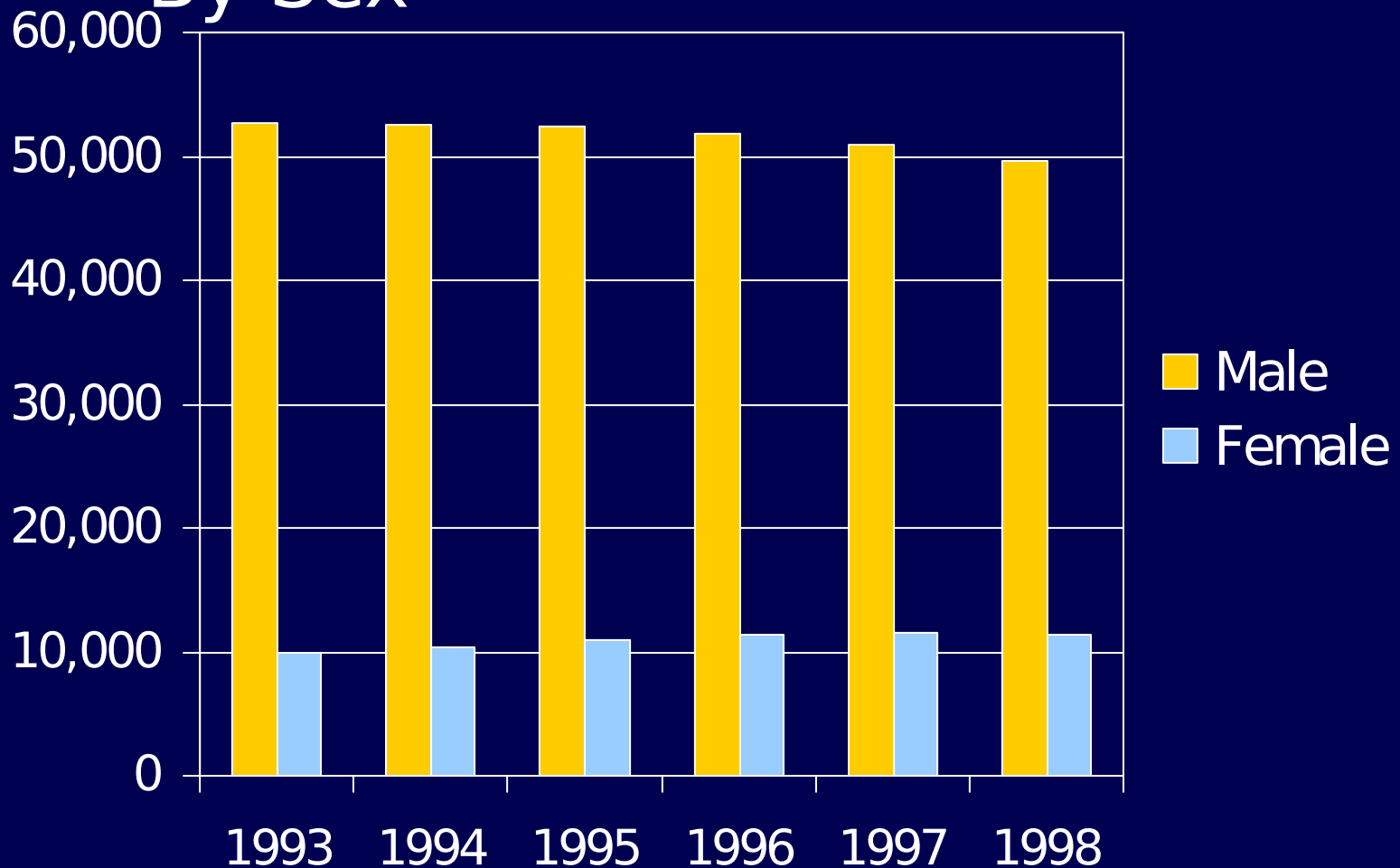
# U.S. Engineering Enrollment by Level and by Year

Source:  
Science & Engineering  
Indicators - 2002

Full- and part-time students



# Bachelors Degrees in Engineering By Sex



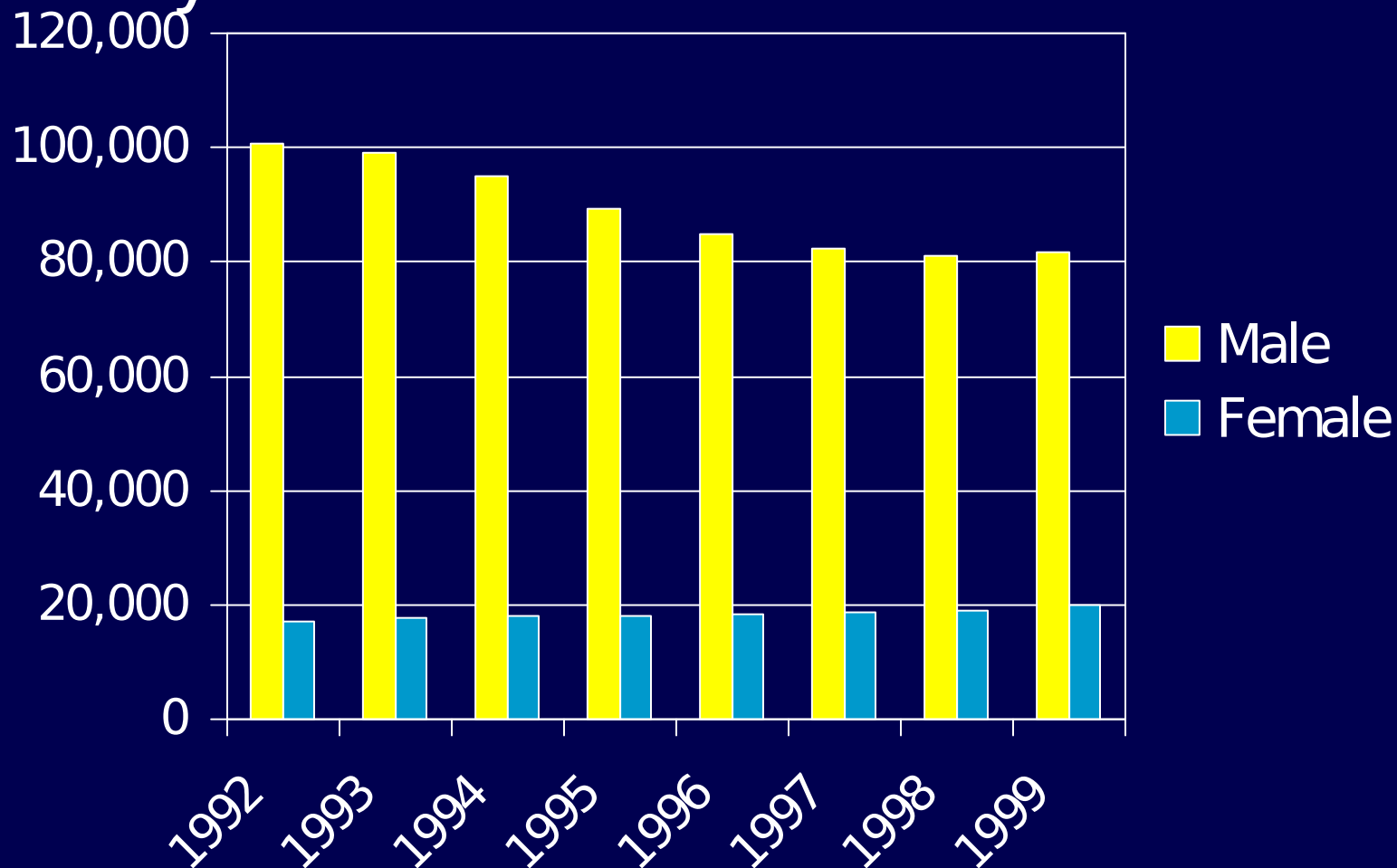
Source: Science & Engineering Indicators - 2002



# Percentage of Engineering Bachelor's Degrees Earned by Women by Race/Ethnicity

- Source: National Science Foundation for 1996 recipients
- Total Female – 18.3%
- White, Non Hispanic – 16.3%
- Asian, Pacific Islander – 21.2%
- Black – 36.4%
- Hispanic – 22.8%
- American Indian, Alaska Native – 21.5%
- (To be read....Of all the Hispanic students receiving Bachelor's Degrees in Engineering, 22.8% were female.)

# Graduate Enrollment in Engineering By Sex



Source: Science & Engineering Indicators - 2002



# Breakdown of Graduate Students in Science and Engineering by Sex and Race/Ethnicity

	<i>White</i>	<i>Asian</i>	<i>Black</i>	<i>Hispanic</i>	<i>American Indian</i>	<i>Unknown</i>	<i>Non-U.S.</i>
Male	32.2	3.9	2	1.9	0.2	2.7	17.3
Female	23.7	2.5	2.7	1.8	0.2	1.9	6.9

Source: National Science Foundation, Survey of Graduate Students in Science and Engineering – 1997 Data

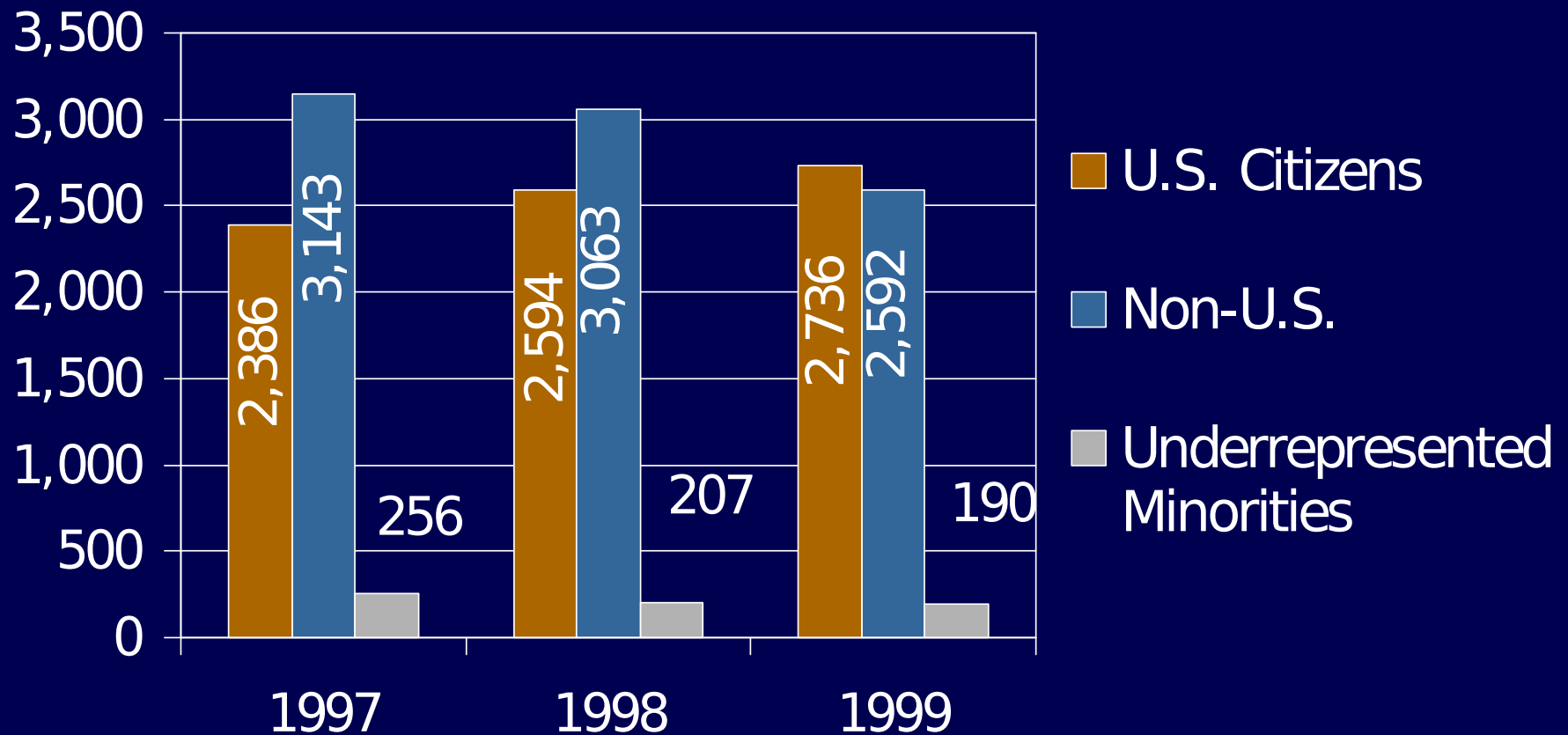


# Breakdown of Graduate Students in Engineering by Sex and Race/Ethnicity


	<i>White</i>	<i>Asian</i>	<i>Black</i>	<i>Hispanic</i>	<i>American Indian</i>	<i>Unknown</i>	<i>Non-U.S.</i>
Male	37.4	6.3	1.9	2.1	0.2	3.6	29.9
Female	8.2	1.8	0.9	0.6	0.1	0.9	6.1

Source: National Science Foundation, Survey of Graduate Students in Science and Engineering – 1997 Data

# Doctorates Awarded in Engineering



Source: Science & Engineering Indicators - 2002



# Minority Female Doctorates Awarded in Engineering

## ■ Black Women

- 1995 - 15
- 1996 - 19
- 1997 - 23

## ■ Hispanic Women

- 1995 - 11
- 1996 - 14
- 1997 - 23


Source: Women, Minorities and Persons with Disabilities  
in Science and Engineering 2000





# What Has Caused These Trends?

- Lack of role models/mentors
- Lack of programs at graduate level to address retention issues
- Females/minorities report lack of identification with professors/administrators
- Females/minorities report lack of others like themselves (interests, cultures, backgrounds)
- Lack of societal value of engineers and scientists
  - Salary examples



# What are the Consequences?

- Without effective and immediate action the downward trends will continue.
- Significant loss of contribution by females and minorities in the composition of the national R&D base.
- Lost opportunities for new diverse perspectives and thinking in the educational and industrial sectors.



# What is NMSU Doing About It?

- Some examples:
  - ADVANCE Institutional Transformation Program
  - Alliance for Minority Participation
  - NMSU Title V Program – Strengthening Hispanic Serving Institutions
  - AGEP – Alliance for Graduate Education and the Professorate
  - Las Cruces Prep, BEST, Girls in Engineering, NASA Aerospace Experiences (K-12 programs)



# What are the Partnering Opportunities?

- Additional graduate fellowships needed with focus on recruitment of women and minorities
- Internships and coops at Army facilities
- Faculty research opportunities are needed for involvement of women and minorities
- Long term partnerships with programs that support female and minority retention programs
- Sponsoring seminars and workshops at institutions such as NMSU to highlight national role models
- Mechanisms?



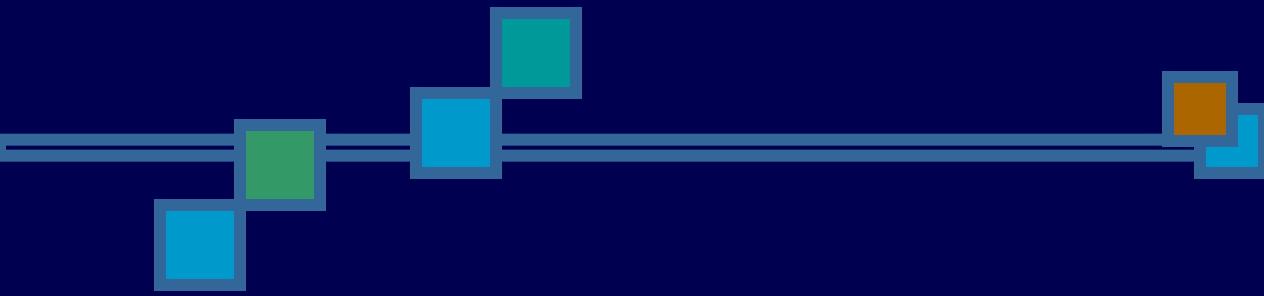
# More Resources on the Trends:

<http://www.nsf.gov/sbe/srs/stats.htm>

National Science Foundation, Division of  
Sciences Resources Statistics

Science And Engineering Indicators 2002

Women, Minorities and Persons with  
Disabilities in Science and Engineering  
2000



Questions?